UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

VOTE SHEET

Date: MAY 29 2002

TO : The Commission
Todd A. Stevenson, Secretary

FROM : Melissa Hampshire, Acting General Counsel
Stephen Lemberg, Assistant General Counsel
Patricia M. Pollitzer, Attorney

SUBJECT : ANPR to amend and update the standard for the flammability of clothing textiles

The staff recommends that the Commission issue an advance notice of proposed rulemaking ("ANPR") discussing possible changes to the Commission's standard for the flammability of clothing textiles under the Flammable Fabrics Act ("FFA"). A draft Federal Register notice is attached at Tab D of the briefing package.

Please indicate your vote on the following options.

I. Approve the draft Federal Register notice without change.

_____ _____
Signature Date

II. Approve the draft Federal Register notice with the following changes (please specify):

_____

_____

_____

_____ _____
Signature Date

5-28-02 XRL
CPSA 6 (b)(1) Cleared WITH GC memo & TAB E removed
___ No Mfrs/PrvtLblrs or Products Identified
√ Excepted by ANPR Accord
___ Firms Notified,
Comments Processed.

III. Do not approve the draft Federal Register notice.

_____ _____

Signature Date

IV. Take other action (please specify):

_____

_____

_____

_____ _____

Signature Date

BRIEFING PACKAGE

STANDARD FOR THE FLAMMABILITY OF CLOTHING TEXTILES

ANPR TO AMEND AND UPDATE

For Further Information Contact:
Margaret L. Neily, Project Manager
Directorate for Engineering Sciences
(301) 504-0508

CPSA 6 (b)(1) Cleared 5-28-02 AB - with gc memo + TABLE removed
___No Mfrs/Prvtlblrs ex
Products Identified
X Excepted by ANPR Cover
___Firms Notified,
Comments Processed.

NOTE: This document has not been reviewed or accepted by the Commission.
Initial ml Date 5/29/02

TABLE OF CONTENTS

EXECUTIVE SUMMARY

In order to reduce the danger of injury and death from burning wearing apparel, Congress passed the Flammable Fabrics Act of 1953 (FFA). The Act incorporated a voluntary standard, "Flammability of Clothing Textiles, Commercial Standard 191-53." The standard provides for testing and rating the flammability of textiles for apparel use. Now codified in the *Code of Federal Regulations*, 16 CFR 1610, the standard establishes three classes of flammability, sets requirements for clothing textiles, and prohibits the use of textiles unsuitable for clothing.

The original standard was issued nearly 50 years ago. Numerous new technologies, products, and modern equipment have been developed since then. Consumer garment care practices have changed significantly. In order to remain effective, the standard needs to reflect current technologies and consumer practices.

While several interpretations and clarifications of the standard have been made over the years, the open system dry cleaning and hand washing methods as well as the original flammability tester used in the standard have become outdated. Test procedures and instructions for recording and interpreting test results are vague and inadequate. Some portions of 16 CFR 1610 need to be updated/revised to facilitate enforcement of the standard and to prevent dangerously flammable fabrics and apparel from entering the market. However, this update does not extend to redefining the standard's acceptance criteria, which are still considered reasonable for a minimum standard of performance. Certain provisions of the implementing regulations, especially exemptions from testing to support guaranties, should also be considered for revision.

Major aspects of the clothing textile standard that are affected by such changes are discussed in the briefing package along with test procedure issues that have caused confusion throughout the history of the standard.

The staff recommends that the Commission publish an advance notice of proposed rulemaking to update and clarify the Standard for the Flammability of Clothing Textiles, 16 CFR 1610.

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

MEMORANDUM **DATE:** MAY 29 2002

TO : The Commission
Todd Stevenson, Secretary

Through: Melissa Hampshire, Acting General Counsel
for Thomas W. Murr, Jr., Acting Executive Director

FROM : Jacqueline Elder, Acting Assistant Executive Director
Office of Hazard Identification and Reduction
Margaret L. Neily, Project Manager
Directorate for Engineering Sciences
(301-504-0508 Ext. 1293)

SUBJECT: Amending the Standard for the Flammability of Clothing Textiles, 16 CFR 1610

I. INTRODUCTION

This memorandum discusses the need for updating/revising certain portions of the Standard for the Flammability of Clothing Textiles, 16 CFR Part 1610. The standard provides a method for testing and rating the flammability of textile products for clothing use.

In 1953 the Secretary of Commerce issued a voluntary standard, "Flammability of Clothing Textiles, Commercial Standard 191-53." Congress incorporated this standard, with several modifications, in the Flammable Fabrics Act of 1953 (FFA), as amended in 1954, to define dangerously flammable fabrics used in wearing apparel. While several interpretations and clarifications of the standard have been made over the years, the dry cleaning and washing methods as well as the original flammability tester used in the standard have become outdated. Certain aspects of the test procedures and instructions for reporting and interpreting test results are somewhat vague. Therefore, some portions of 16 CFR 1610 need to be updated/revised to facilitate enforcement of the standard and ensure that dangerously flammable fabrics and apparel do not enter the market. However, this discussion does not extend to redefining the standard's acceptance criteria which are still considered reasonable for a minimum standard of performance. Certain provisions of the implementing regulations, especially exemptions from testing to support guaranties, should also be considered for revision.

II. BACKGROUND

Some of the most devastating of all burn injuries result from clothing ignitions. Based on the most recent five years of available data, 153 deaths and an estimated 4,000 hospital emergency department-treated injuries result annually from the ignition of clothing. **(TAB A)**

The purpose of this standard is to eliminate from the marketplace dangerously flammable clothing textiles, such as certain light weight or brushed fabrics, thereby reducing the danger of injury or death from burning apparel. The standard provides national requirements for testing and rating the flammability of textiles for apparel use. The standard establishes three classes of flammability, sets requirements for clothing textiles, and warns against the use of textiles unsuitable for clothing.

Fabrics are tested in their original state (as sold) and after dry cleaning and washing. The dry cleaning and washing procedure was intended to remove any fugitive (nondurable) flame retardants that might have been added to pass the test. Durable flame retardants were not available when the standard was first developed. Fabric classifications are determined by burn times measured and the intensity (base burning) observed. Class 1 is defined as normal flammability, Class 2 is intermediate flammability, and Class 3 is rapid and intense burning.[1] The sale of Class 3 fabrics is prohibited by the FFA.

Section 30(b) of the Consumer Product Safety Act of 1972 transferred the authority for administering the FFA to the Consumer Product Safety Commission (CPSC). In 1975 CPSC codified the FFA of 1953, as amended in 1954, as 16 CFR Part 1609 and the Standard for the Flammability of Clothing Textiles as 16 CFR Part 1610. In 1994, an amendment of Subpart A—The Standard removed footnotes that revealed the original test equipment manufacturer's name and address (previously the sole source for the tester). Subpart B—Rules and Regulations and Subpart C—Interpretations and Policies include numerous provisions issued or amended to clarify the test procedures, test equipment, test criteria, interpretations of test results, and the use of alternate test apparatus/criteria for guaranties.

In 1981 the CPSC laboratory staff drafted a laboratory test manual entitled "Compliance Testing of General Wearing Apparel." The manual documented flammability testing procedures used at CPSC for compliance testing under 16 CFR 1610. The test manual describes the staff procedures for testing and reporting test results. Certain areas of the laboratory procedures in the test manual are slightly different from the procedures stated in the standard. The procedures in the test manual were based on CPSC testing experience and the new products and technology emerging since the standard's adoption.[2]

[1] Superscripts designate references at the end of this memorandum.

III. DISCUSSION

The original standard was issued nearly 50 years ago. Numerous new technologies/products and modern equipment have been developed since then. Consumer garment care practices have changed significantly. In order to reflect current technologies and consumer practice, the standard needs to be updated. Major aspects of the clothing textile standard that are affected by such changes are briefly discussed below along with test procedure issues that have caused confusion throughout the history of the standard.

A. Flammability Tester

The flammability tester required by the standard is a mechanical apparatus for which blue prints are not available. The tester is outdated and no longer available for purchase. Industry and independent testing laboratories are currently using more modern flammability testers that incorporate electro-mechanical components to apply the ignition flame and measure the fabric burn time. These testers are produced by a number of manufacturers. Subpart B—Rules and Regulations authorizes the use of alternate (such as modern) equipment for guaranty purposes, provided that the alternate produces results for a particular fabric that are as stringent as or more stringent than the results obtained with the apparatus described in the standard. However, specifications for the flammability tester need to be drafted to reflect modern technologies and to allow their manufacture by multiple sources. **(TAB B)**

B. Dry Cleaning Method

The standard requires fabrics to be dry cleaned and washed before testing and uses perchloroethylene in an open vessel for dry cleaning. This method does not meet strict Environmental Protection Agency (EPA) regulations for perchloroethylene emissions. This procedure is known to be an unsafe practice since the operator may be subject to inhaling a chemical which has been shown to cause cancer in animal tests. Newer commercial dry cleaning methods and equipment have been developed under the EPA regulations that restrict the release of perchloroethylene into the environment. The dry cleaning method used in the standard needs to be updated to ensure operator and environmental safety. **(TAB B)**

CPSC staff reviewed other existing standards that incorporate dry cleaning methods appropriate for clothing textiles. British and Canadian standards specify modern methods with commercial dry cleaning machines. However, the equipment is not available in the United States and/or does not comply with EPA environmental regulations. Option B of ASTM D 1230-94, Standard Test Method for Flammability of Apparel Textiles, specifies any commercial dry cleaning operation in a closed environment. **(TAB B)** Adapting a common commercial dry cleaning specification appears the most promising approach for updating the dry cleaning procedure of the current standard.

C. Laundering Method

After test fabrics are dry cleaned, the standard requires the specimens to be hand washed with neutral chip soap and line-dried. Consumer garment care practices, automatic home laundering equipment, and detergents have changed significantly over the years. Hand washing with chip soap followed by line drying is an outdated method for washing clothes. Consumers routinely use automatic washers and dryers to launder their clothes today. In addition, neutral chip soap is no longer available for home cleaning. Today's detergents are non-phosphate powders and liquids. A practical laundering method is needed for the standard to reflect these changes. The staff has some indication that certain fabrics change and may become dangerously flammable after a machine wash/tumble dry laundering. **(TAB B)** An updated home laundering procedure based upon the American Association of Textile Chemists and Colorists' standard, AATCC 124-1996, including the non-phosphate Standard Reference Detergent 1993, was recently incorporated in other FFA standards and should be considered here.[3]

It is important to consider the impact on the dry cleaning and washing requirements for testing in light of another change since the Standard became effective. The Federal Trade Commission promulgated rules (16 CFR 423) requiring care labeling of textile apparel and certain piece goods (fabrics). Among other things, the labeling must describe the regular care for the product and warn of any cleaning procedure that would harm the product. **(TAB C)** The staff recommends seeking comments regarding the use of care labels to determine test conditions under the standard.

D. Test Procedures

Manufacturers and independent testing laboratories have raised many questions regarding the appropriate test procedures and materials or equipment required by the standard. The most significant of these issues are discussed in **TAB C**. The staff identified confusing sections of the test procedure, including the directions for selecting the surface or direction of the fabric to be tested and the directions for determining when to test 5 additional specimens. Silica gel, a more efficient desiccant than calcium chloride, has been widely used for many years and should be specified for cooling test specimens. These requirements of the standard need to be revised or clarified to ensure correct and consistent procedures are followed. The staff also recommends seeking public comment on the necessity of clarifying other test procedures and specifying equipment for brushing, mounting, and conditioning of specimens. **(TAB C)**

E. Test Result Interpretation and Reporting

The classification of textile fabric flammability is based on laboratory test results. The classification of a plain surface fabric is determined by average burn time and is usually simple. However, burning characteristics of raised fiber surface fabrics are quite complicated. Classes of raised surface fabrics are determined not only by fabric burn times but also by the intensity of the surface burning. Because intensity is defined by the observation of base fabric ignition or fusing (melting), fabric flammability classification

8

is not so straightforward. Classification can be incorrect due to misinterpretation of test results and observations. Clearer instructions for calculating burn times and establishing the occurrence of a base burn for raised surface fabrics are critical for correct and consistent fabric classifications. **(TAB C)**

In addition, laboratories report their test results differently because there are no standard reporting codes to describe observed burning behavior. Descriptive test result codes such as those used by CPSC staff are needed for laboratories to report test results accurately and consistently. **(TAB C)**

F. Text Reorganization for Clarity

The current standard is not well organized, which contributes to misunderstandings of the requirements and incorrect testing. The same topic is often discussed in several different sections (e.g. Subpart A—The Standard and Subpart C—Interpretations and Policies), making it difficult for readers to find all relevant provisions. There are footnotes in the standard that are either unnecessary/obsolete or could be moved into the text for clarity. Organizational improvements for the current standard are needed to facilitate clearer understanding. **(TAB C)**

G. Clarification and amendment of Subpart B—Rules and Regulations

Under § 1610.37(d) of the standard, all fabrics made of certain fibers and other fabrics over 2.6 ounces per square yard do not have to be tested to support a guaranty for those fabrics. However, new fibers have entered the marketplace in recent years that are not covered by the exemption. The staff has also seen adverse effects of finishes on the flammability of light weight exempted fabrics. The staff recommends seeking public comment on the scope, adequacy, and appropriateness of these exemptions. **(TAB E—Restricted)**

IV. CONCLUSIONS

The staff believes that the problems identified above are substantive and that large portions of the Standard should be updated and revised. Test equipment and test methods should be updated to reflect modern technologies, new products and consumer practice. The staff has some indications that certain fabrics change and may become dangerously flammable after a machine washing and tumble-drying. Test procedure clarification is critical because an incorrectly followed test procedure often produces incorrect test results. A draft advance notice of proposed rulemaking (ANPR) to make these changes is at **TAB D.** The usual 60 day public comment period is specified.

9

V. OPTIONS

1. Make no changes in the present standard (test equipment, test methods, description of test procedure, data interpretation/reporting, text organization in the standard, and rules and regulations).

2. Issue an advance notice of proposed rulemaking (ANPR) to make changes and solicit comments as noted in the draft *Federal Register* notice.

VI. RECOMMENDATION

In order to maintain the protection offered by a minimum requirement for clothing textile flammability performance, the staff recommends that the Commission issue an ANPR to consider amending 16 CFR 1610, Standard for the Flammability of Clothing Textiles. Public comments would be solicited on the issues associated with identified sections of the standard for the usual 60 day period.

10

REFERENCES

1. Standard for the Flammability of Clothing Textiles, 16 CFR 1610

2. CPSC Engineering Laboratory Test Manual, "Compliance Testing of General Wearing Apparel," 1981.

3. Standards for the Flammability of Children's Sleepwear, Carpets and Rugs, and Mattress and Mattress Pads, *Code of Federal Regulations*, Title 16, Chapter 2, Revised as of January 1, 2000.

ACKNOWLEDGEMENT: While on detail to the Division of Mechanical Engineering, ES, Weiying Tao made valuable and substantive contributions to this briefing memorandum.

Tab A

UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: 02/22/02

TO : Margaret Neily, Project Manager, Wearing Apparel
Directorate for Engineering Sciences

THROUGH: Susan Ahmed, Associate Executive Director, RR for SA
Directorate for Epidemiology

FROM : Linda E. Smith, EPHA LES

SUBJECT : Amending the Standard for the Flammability of Clothing Textiles

This memorandum was prepared as part of the Consumer Product Safety Commission (CPSC) staff proposal to update the Standard for the Flammability of Clothing Textiles, 16 CFR Part 1610. Estimates of clothing ignition-related deaths and injuries are presented for the most recent five-year period for which data were available. Data presented may include deaths and injuries that involve ignition of children's sleepwear for which other standards apply, Standard for the Flammability of Children's Sleepwear: Sizes 0 Through 6X, 16 CFR Part 1615, and the Standard for the Flammability of Children's Sleepwear: Sizes 7 Through 14, 16 CFR Part 1616.

Methodology

Fatalities involving clothing ignition were identified from the National Center for Health Statistics mortality data for 1995 – 1999. NCHS data represent comprehensive counts of U.S. fire death causes as reported by death certificates. For 1995-1998, all clothing ignitions were identified as external cause of death = 893, accident caused by ignition of clothing. For 1999, clothing ignitions were divided into two external cause codes. External cause of death X05 denoted exposure to ignition or melting of nightwear. External cause of death X06 denoted exposure to ignition or melting of other clothing and apparel.[1] In 1999, but not earlier years, the coder needed to know the clothing type in order to place it in one of the two clothing ignition codes. As a result, if the death involved unspecified clothing, the death may have been coded under one of the other fire-related codes, potentially reducing the number of deaths identified as clothing ignition in 1999.

Injuries involving clothing ignition during 1996 to 2000 were identified from CPSC's National Electronic Injury Surveillance System (NEISS), a probability sample of product-

[1] The change in external cause of death codes resulted from the revision of the International Classification of Diseases that took effect for 1999 fatalities (ICD-10).

associated injuries treated in hospital emergency departments. Incidents involving clothing ignition were identified in NEISS comments when the injury was associated with any of the following product codes:

Product Code	Definition
1644	Nightwear
1645	Daywear
1646	Outerwear
1677	Other Clothing
1658	Clothing, Not Specified

Results

Based on NCHS mortality data, 153 deaths that were related to clothing ignition occurred annually from 1995 to 1999 (Table 1). Three deaths annually (2 percent) involved children younger than age 15. Even though the 1999 revision to the reporting system allowed identification of nightwear, neither of the two deaths to children in 1999 involved nightwear.

Table 1
Deaths Related to Clothing Ignition
By Year of Death and Age Group

Year of Death	Count	Age Group (Years)	
		<15	15+
Total	767	15	752
1999*	119	2	117
1998	171	6	165
1997	166	3	163
1996	160	2	158
1995	151	2	149
Average	153	3	150

* 1999 data are not directly comparable to previous years due to the change in the reporting system discussed in the Methodology. NCHS preliminary estimates indicate a comparability ratio of .97, indicating that the 119 deaths reported for 1999 may have been 122 deaths if the reporting system had not changed.
Source: National Center for Health Statistics (NCHS)
U.S. Consumer Product Safety Commission/ EPHA

Based on NEISS data, an estimated 4,000 injuries caused by clothing ignition were treated annually in hospital emergency rooms during the period 1996 to 2000 (Table 2). This estimate has a 95 percent confidence interval of 2,000 to 5,000 based on unrounded estimates. Children younger than age 15 accounted for 26 percent of the annual injuries. Few injuries to children younger than age 15 were reported to involve sleepwear.

Table 2
Injuries Related to Clothing Ignition
Treated in Hospital Emergency Departments,
By Year of Injury and Age Group (percent)

Year of Injury	Estimate	Age Group(Years)	
		<15	15+
Total	18,000	26%	74%
2000	4,000	25%	75%
1999	4,000	28%	72%
1998	3,000	35%	65%
1997	4,000	26%	74%
1996	3,000	17%	83%
Average	4,000	26%	74%

Note: Estimates rounded to the nearest 1,000.
Source: National Electronic Injury Surveillance System (NEISS)
U.S. Consumer Product Safety Commission

Summary

Based on the most recent five years of available data, 153 deaths and an estimated 4,000 hospital emergency department-treated injuries result annually from ignition of clothing. It is uncertain how much of the observed decrease in 1999 clothing ignition deaths was due to the change in reporting system and how much was due to a true reduction.

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Tab B

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

Memorandum

Date: February 28, 2002

TO: Margaret Neily, Project Manager
Directorate for Engineering Sciences

Through: Andrew Stadnik, Associate Executive Director,
Directorate for Laboratory Sciences
Ed Krawiec, Acting Director,
Division of Electrical Engineering, Laboratory Sciences

FROM: Weiying Tao, Textile Technologist, Division of Electrical Engineering WT

SUBJECT: Amending the Flammability Tester Specifications, the Dry Cleaning and Hand Washing Procedures of the CPSC Flammability Regulations in 16 CFR Part 1610

The Standard for the Flammability of Clothing Textiles, 16 CFR Part 1610 (1), was originally issued in 1953 by the Department of Commerce as Commercial Standard 191-53. Consumer practices and technologies have been changed significantly over the past 49 years. Test equipment and procedures used in the standard are outdated and need to be updated. The purpose of this memo is to discuss those portions of the current clothing flammability standard that the staff recommends be revised.

BACKGROUND

The CPSC Flammability Regulation, 16 CFR Part 1610, provides a method of testing the flammability of clothing textiles to protect consumers from dangerously flammable garments. The original clothing textile flammability standard was issued by the Department of Commerce as the Flammability of Clothing Textiles, Commercial Standard (CS) 191-53 and was included in the Flammable Fabrics Act (FFA) of 1953. The Act was amended in 1967 to include " ... products of interior furnishings and wearing apparel made from fabric....".

In 1972, Congress established the Consumer Product Safety Commission (CPSC) and transferred to it the authority for the Flammable Fabrics Act. In 1975, the Commission

(CPSC) codified the Flammable Fabrics Act as 16 CFR Part 1609 and the Standard for the Flammability of Clothing Textiles as 16 CFR Part 1610. The purpose of 16 CFR Part 1610 is to provide "... standard methods of testing and rating the flammability of textiles ... ". CPSC published the Final Enforcement and Administrative Rules of 16 CFR Part 1610 in the Federal Register in May of 1983. Subpart B was amended by the addition of a new paragraph at Part 1610.40 which allows the use of alternate apparatus or procedures providing the user has on hand data or information to demonstrate that the alternative is as stringent or more stringent than the test in the Standard (§1610.40 (d)(i)). The most recent amendment was made in June 1994 to remove footnotes revealing a manufacturer's name and address for equipment (2).

Several requirements of Part 1610 now need to be changed because of: (1) the unavailability of the flammability tester originally specified in the FFA, (2) the carcinogenic potential of perchloroethylene (perc) in the dry cleaning requirement and several Environmental Protection Agency (EPA) acts that regulate environmental releases of perc, and (3) the use of an outdated hand washing procedure. Apparel manufacturers, CPSC and other test laboratories can then follow and fully comply with the flammability testing requirements for clothing textiles.

SUGGESTED REVISIONS TO THE STANDARD

To address the outdated portions in this Standard, the staff suggests the following revisions:

1. Replace the currently specified flammability tester with a modern instrument;
2. Replace the current dry cleaning procedure with a commercial dry cleaning process; and
3. Replace the current hand washing procedure with a procedure which involves the use of a commercially available washer and dryer and a specified detergent.

Each of these proposed revisions is discussed in detail below.

FLAMMABILITY TESTER

The original flammability tester described in §1610.4(b) is a mechanical apparatus that contains:

- a "spring-motor-driven gas jet" that applies the flame;
- a "trigger .... (that) serves to wind the spring-motor";
- a "starting lever" that when released operates the gas jet;
- a "driving mechanism" which moves the gas jet into position and starts the timing device at the moment of flame impingement; and

- a mechanical "stopwatch" which is actuated with the "timing mechanism .... by means of special attachments" that measures total specimen burn time from moment of flame impingement.

The tester described above is no longer available for purchase. Apparel manufacturers and other testing laboratories are currently using more modern flammability testers which incorporate an electronic timer in place of the stopwatch, and several other electro-mechanical devices (a variety of servo-motors, solenoids, micro-switches, and electronic circuits, in addition to miscellaneous custom made cams and rods, shock absorbing linkages, and various other mechanical components) that control and apply the flame impingement. The CPSC acquired three different modern flammability testers that perform the flammability test according to the specifications listed in §1610.4(b).

The use of these modern flammability testers is authorized under §1610.40 which allows the use of an "alternate apparatus." This section requires that the "alternate apparatus" produce results that are as stringent as or more stringent than the results obtained with the apparatus described in the standard.

DRY CLEANING

The method of dry cleaning specified in 16 CFR 1610 uses perchloroethylene in an open vessel. This procedure is known to be an unsafe practice since the operator may be subject to inhaling a chemical which has been shown to cause cancer in animal tests (3). Dry cleaners are required to comply with Environmental Protection Agency (EPA) regulations for perc release. The 1610 procedure does not comply with EPA regulations and the Commission staff has not used this procedure since 1986. The CPSC laboratory and others participated in an American Society for Testing and Materials (ASTM) Round Robin test in 1991 comparing results from the 16 CFR 1610 dry cleaning and hand washing/line drying procedure with those from ASTM D 1230, Standard Test Method for Flammability of Apparel Textiles, using both coin-operated and commercial dry cleaning procedures with machine washing/tumble drying (4). The outcome for the fabrics tested revealed that the ASTM D 1230 refurbishment method was just as stringent if not more stringent than the conditioning for the flammability test procedures in the 16 CFR Part 1610 (5). These results may support the use of ASTM Standard D 1230 procedures using commercial dry cleaning followed by the specified machine wash/tumble dry method.

HAND WASHING

After the fabric specimens are dry cleaned, 16 CFR 1610 requires that they be hand washed with neutral chip soap and line dried per §1610.4(e) before testing them for flammability. However, hand washing with neutral chip soap followed by line drying are outdated methodologies for washing clothes. Neutral chip soap is no longer available

to consumers. Consumers today use non-phosphate detergent instead of soap and routinely use home washers and dryers. Furthermore, limited flammability test results on certain fabrics tested at the CPSC Engineering Laboratory indicated that for some raised surface fabrics the "machine wash/tumble dry method" is more stringent than the refurbishing procedures currently specified in the standard (6). Changing the requirements to reflect current consumer laundering practices ensures a more realistic conditioning procedure than the currently specified hand washing/line drying method in the standard.

The Commission recently updated the specifications for laundering/drying and the use of detergent in other Flammable Fabrics Act standards. Pertinent sections of the American Association of Textile Chemists and Colorists (AATCC) 124-1996 were incorporated, including the use of standard detergent 1993, a nonphosphate detergent. This procedure could also be used for 1610.

SUMMARY

The flammability tester and the refurbishing procedures specified in 16 CFR 1610, Standard for the Flammability of Clothing Textiles, should be updated. Textile and apparel industries have indicated support for such updating to allow CPSC and industry to more accurately evaluate clothing textile flammability (7).

REFERENCES

1. 16 CFR Part 1610 Standard for the Flammability of Clothing Textiles.

2. CPSC CFR Part 1610, Amendment to Remove Footnotes, effective June 28, 1994, Federal Register Vol. 59, No. 123, Pages 33193 to 33194.

3. EPA and CPSC, The Inside Story—A Guide to Indoor Air Quality, page 17, September 1993.

4. Report of Testing To Determine If The Refurbishing Procedures of ASTM D1230 Are Equivalent To 16 CFR Part 1610 As Measured By The Flammability Test For Clothing Textiles, Submitted by Bruce P. Holzschuh, Chairman ASTM D13.5201, November, 1984.

5. Letter to Don Knodel, Chairman of ASTM Subcommittee D13.52 Flammability, from Linda Fansler, Directorate for Engineering Sciences, June 16, 1993.

6. Memorandum to L. James Sharman, Fire Program Officer, OPM, from Patricia Fairall, ESMT and Mary Toro, ESMT, January 29, 1985.

7. Log of Meeting by Linda Fansler, CPSC, Directorate for Laboratory Sciences, Meeting with John Michener, ASTM/AATCC Representative, November 7, 1996.

United States
CONSUMER PRODUCT SAFETY COMMISSION
Washington, D.C. 20207

MEMORANDUM

Date: March 1, 2002

TO: Margaret Neily, Project Manager
Directorate for Engineering Sciences

Through: Andrew Stadnik, Associate Executive Director, Andrew Stadnik
Directorate for Laboratory Sciences
Ed Krawiec, Acting Director,
Division of Electrical Engineering, Laboratory Sciences

FROM: Weiying Tao, Textile Technologist, Division of Electrical Engineering WT

SUBJECT: Alternate Dry Cleaning and Washing Requirements of Apparel Specified in Standards other than 16 CFR Part 1610 Standard for the Flammability of Clothing Textiles

There are many textile standards addressing dry cleaning and washing procedures for clothing. Many of these standards were reviewed to determine if any of them containing dry cleaning and washing requirements are relevant to the discussion of the need to update the specifications in 16 CFR Part 1610. This memorandum summarizes the results of the review.

BACKGROUND

The Consumer Product Safety Commission (CPSC) staff is seeking to amend 16 CFR Part 1610, the Standard for the Flammability of Clothing Textiles, originally issued in 1953. The staff conducted a search of other textile standards to determine if the clothing refurbishing procedures (dry cleaning and washing) specified in those standards were relevant to 16 CFR Part 1610. The search began with a list of standards from the CPSC data base (reproduced from Information Handling Services®, The Worldwide Standards Service Plus© 1997 by IHS) that pertained to the key words "dry cleaning" and "refurbishing" of apparel. From that list of approximately 60 standards, over 1/2 were eliminated as having no relevance to clothing flammability. An additional search was conducted at the National Institute of Standards and Technology by cross referencing standards obtained from AFNOR (Association Francaise de

Normalisation), BSI (British Standards Institution), and DIN (Deutshes Institut fur Normung). As detailed below, the three most relevant standards specified modern dry cleaning methods, and two of them also specified laundering methods.

The present 16 CFR Part 1610 specifies a refurbishing procedure that uses perchloroethylene (perc) in an open-to-the air dry cleaning procedure followed by a hand wash laundering with neutral chip soap and (line) drying. CPSC discontinued use of perchloroethylene, a chemical shown to cause cancer in animals, in 1985. The hand washing procedure is no longer used since it does not reflect current laundering practice. On occasion, the staff has used a refurbishing procedure specified in the American Society for Testing and Materials (ASTM) D1230, Standard Test Method for Flammability of Apparel Textiles. The refurbishing procedure found in ASTM D1230 reflects current consumer practices and was found to be as stringent as the procedure specified in the 16 CFR Part 1610. The use of such a procedure is allowed in 16 CFR 1610 as long as it results in a test at least as stringent as would be obtained using the procedure specified in the standard. This memorandum discusses the current 16 CFR Part 1610 requirements and each of the standards identified as having relevancy to the issue of conditioning fabric samples for tests of their flammability.

PRESENT STANDARD

CURRENT MANDATORY STANDARD
16 CFR Part 1610 STANDARD FOR THE FLAMMABILITY OF CLOTHING TEXTILES

This mandatory standard specifies methods for testing the flammability of clothing and textiles intended for apparel uses. Fabric specimens are tested in both their original state and after dry cleaning and hand washing. The dry cleaning method uses a solution consisting of perchloroethylene and a dry cleaning soap (potassium hydroxide solution) which is placed inside a three gallon open cylinder apparatus with the test fabric. The cylinder is rotated for 25 minutes followed by three five minute rotations at the beginning of which the solution is replaced by fresh perchloroethylene without soap. After removing the excess solvent, the samples are allowed to air dry. A hand washing procedure is then performed using 0.5% neutral chip soap in warm water followed by rinsing and drying at room temperature. The dry cleaning and hand washing procedures are no longer used as a refurbishing procedure because:

- Perchloroethylene (perc) is a carcinogenic chemical, and releases of perc are regulated by Environmental Protection Agency (EPA) under several Acts; and

- hand washing in neutral soap and line drying do not reflect current practice.

OTHER STANDARDS

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 1230-94, STANDARD TEST METHOD FOR FLAMMABILITY OF APPAREL TEXTILES

This voluntary standard specifies methods for testing and evaluating the flammability of textile fabrics used as apparel in both original state condition and after refurbishment. The standard specifies two dry cleaning options as described below:

- Option A uses a coin operated drycleaning machine. A mixture of amine sulfonate detergent, water and perchloroethylene is used in a coin operated dry cleaning machine vented to the environment. The machine runs through a complete dry-to-dry cycle. Option A is no longer used because coin operated machines have been discontinued and are no longer available (1).

- Option B uses any closed environment commercial dry cleaning for one cycle.

After the fabric is dry cleaned, it is laundered using residential quality washing and drying machines. If no fabric care instructions are provided, the samples are machine washed in warm water and tumble dried on the "normal" setting.

ASTM D 1230 refers to the American Association of Textile Chemists and Colorists (AATCC) Test Method 135 entitled Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics. This voluntary standard specifies the type of detergent, washing and drying conditions and washer and dryer specifications. The AATCC updated Test Method 135 in 1995 to reflect changes in consumer practice and currently specifies a nonphosphate detergent: AATCC Standard Detergent 1993. However, the current ASTM D 1230-94 was updated in 1994 (one year before Test Method 135's update) and it refers to the old AATCC Standard Detergent 124, a phosphate based detergent which is no longer available. Members of the ASTM subcommittee D13 have indicated that the ASTM D 1230 Standard will be updated to reflect the use of nonphosphate detergent after 16 CFR 1610 is updated (2,3).

An analysis of the test data from an ASTM interlaboratory round robin indicates that for the fabrics subjected to Option B of ASTM D 1230, this procedure is as stringent or more stringent than the refurbishing procedure in 16 CFR Part 1610. A June 1993 CPSC letter responding to the ASTM round robin assessment report states that the ASTM D 1230 procedure is acceptable as long as manufacturers "continue to meet the requirements in 16 CFR Part 1610," and that they "...may only rely on the refurbishing procedures in ASTM D1230 as an alternate to the procedure in 16 CFR 1610 (4)." This is consistent with the 16 CFR Part 1610, §1610.40 entitled "Use of alternate apparatus, procedures, or criteria for tests for guaranty purposes." Using alternate refurbishing

procedures is authorized as long as the procedures are at least as stringent as 16 CFR Part 1610.

BRITISH STANDARDS INSTITUTION (BSI)
BS EN ISO 3175: 1996 TEXTILES -- EVALUATION OF STABILITY TO MACHINE DRYCLEANING

The purpose of this standard is to determine whether normal to very sensitive fabrics can be dry cleaned by examining dimensional changes after three to five cleaning treatments. This standard uses a commercial dry cleaning machine containing perchloroethylene and a detergent. The dry cleaning treatment is followed by "an appropriate restorative finishing procedure.... which comprises some form of steam treatment and/or hot pressing." If the fabric contains heat sensitive fibers or is very heat sensitive, a lesser drying temperature or line drying is used.

This standard uses a modern procedure in the form of a commercial dry cleaning machine but such a machine would not necessarily be available in the U.S. and would have to have appropriate environmental controls installed. The standard does not have a laundering procedure.

CANADIAN GENERAL STANDARDS BOARD (CGSB)
CAN/CGSB-4.2 No. 30.3-94, PROCEDURE FOR THE REMOVAL OF NON-PERMANENT FLAME-RETARDANT TREATMENTS FROM TEXTILE PRODUCTS

The purpose of this dry cleaning and laundering standard is to test fabrics for the presence of nonpermanent flame-retardant treatments applied to textile products. It is an update to CAN/CGSB2-4.2-M77, Method 30.3 (1980) which was similar to the refurbishing method in 16 CFR Part 1610. The procedures (5) specify that the fabric should be initially dry cleaned in either a coin-operated perchloroethylene dry cleaning machine or in any commercial dry cleaning operation. This is followed by laundering in *a residential quality washing machine using neutral chip soap and dried according to* the care instructions provided by the fabric manufacturer. One dry cleaning and one laundering cycle are recommended. The washing machine specified in this standard is not currently available in the U.S.

CONCLUSIONS

Approximately seventy standards were evaluated for their relevancy to current dry cleaning and washing of apparel. Three of these textile-related standards were identified as relevant because they used modern dry cleaning procedures.

The most relevant dry cleaning procedures were found in ASTM D 1230, Option B. It allows the use of any commercial dry cleaning operation. In the current mandatory dry

cleaning procedure of 16 CFR Part 1610, the dry cleaner uses perchloroethylene in an open environment which violates EPA regulations. The ASTM standard clearly protects testers from the effects of perchloroethylene and complies with EPA regulations. In addition, it uses modern machine washers and dryers for laundering such as those used in many households today. However, it uses phosphate detergent not currently found in the U.S.

The review of other relevant standards suggests that the specifications for machine washing and drying procedures included in the recent amendments to other Flammable Fabrics Act standards are also appropriate for inclusion in revisions to Part 1610.

REFERENCES

1. Telecon by Gail Stafford, LS, of conversation with John Michener of Milliken, dated October 16, 1996.

2. Log of meeting by Linda Fansler, CPSC, Directorate for Laboratory Sciences, ASTM and AATCC Standard Test Methods, February 7, 1996.

3. Log of meeting by Linda Fansler, CPSC, Directorate for Laboratory Sciences, meeting with John Michener, ASTM/AATCC representative, November 7, 1996.

4. Letter to Don Knodel, Chairman of ASTM subcommittee D13.52 flammability, from Linda Fansler, Directorate for Engineering Sciences, June 16, 1993.

5. Memorandum to Margaret Neily from Gail Stafford, LS, "Textile Laundering Standards." August 18, 1998, Consumer Product Safety Commission.

Tab C

UNITED STATES
CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

Memorandum

Date: March 25, 2002

TO : Margaret Neily, Project Manager
Directorate for Engineering Sciences

THROUGH: Hugh McLaurin, Associate Executive Director
Directorate for Engineering Sciences

FROM : Weiying Tao, Textile Technologist, previously on detail to ESME WT

SUBJECT : Proposed Revisions for the Standard for the Flammability of Clothing Textiles

The Standard for the Flammability of Clothing Textiles 16 CFR Part 1610 provides a method for testing and classifying the flammability of textile products for clothing use. The standard was originally issued in 1953 by the Department of Commerce as Commercial Standard CS 191-53 and incorporated in the Flammable Fabrics Act of 1953 by the Congress. Although several implementing regulations were made thereafter, certain portions of the current standard are unclear, outdated, and/or inconsistent with the CPSC Engineering Laboratory Test Manual issued in May 1981. Over the past 49 years, many questions have been raised concerning test equipment, test procedures and interpretations of the test results. This memo addresses the needs for revising portions of the current standard. Updating the dry cleaning method, washing procedure and flammability tester used in the standard are discussed in another memo. This report is primarily concerned with the following sections that could benefit from clarification and suggested revisions:

1. Clarify procedure for selecting surface/direction to be tested (preliminary tests)

CFR 1610 (Revised as of January 1, 1999)[1] page 566 section 1610.4(a)(2) states that

> For textiles without a raised-fiber surface the long dimension shall be that in which they burn most rapidly, and the more rapidly burning surface shall be tested. To establish the long dimension and the surface, preliminary tests are made as described in paragraph (g) of this section, with specimens cut in different directions.

This statement does not clearly describe the procedures for selecting the sample surface and direction to be tested. The CPSC Engineering Laboratory Test Manual[2] states on page 10 that two preliminary specimens (one cut in the horizontal direction and one in the vertical direction of the fabric) are first tested according to the specified test procedures to determine if the burning rates are different with respect to the direction of the fabric. Ten additional specimens are then cut with the long dimension in the fastest burning direction determined by the preliminary tests.

If there is no directional difference, then the vertical direction of the garment should be the long dimension of the specimen. These descriptions could be added to the standard.

CFR 1610 page 566 section 1610.4(a)(3) states that

> For textiles having a raised-fiber surface, the direction of the lay of the surface fibers shall be parallel with the long dimension of the specimens. For this type of textiles with varying depths of pile, tufting, etc., the specimens are taken from that part and tested on that surface which has the fastest rate of burning.

This statement does not describe how to determine which area is the most flammable area. The CPSC Engineering Laboratory Test Manual specifies on pages 10 and 11 that for raised fiber surface

> The direction of the lay of the surface fibers shall be parallel with the long dimension of the specimen. Ten specimens are taken from that part of the raised fiber surface which appears to have the fastest burn time. This is determined by a preliminary, visual observation of the sample for the fuzziest area. Past experience has shown this to be the most flammable area of raised fiber textiles.

The method stated in the test manual for determining the surface and area to be tested could be used in the standard.

CFR 1610 does not provide information on how to test specialty fabrics, such as those with metallic threads or other unusual surface structures. It is important to test such fabrics at the more rapidly burning direction and surface. Preliminary tests shall be performed at different directions and areas to determine the most flammable direction and surface. It may be desirable for the standard to provide more specific guidance for conducting preliminary tests on such fabrics.

2. Clarify when testing 5 additional specimens (especially raised fiber surfaces) is required and when it is unnecessary

CFR 1610 clearly specifies when to test 5 additional specimens for plain surface fabrics. On page 572 section 1610.4(g)(7)(i), the standard states that if the time of flame spread is less than 3.5 seconds or if the first 5 specimens do not burn, 5 additional specimens should be tested. However, CPSC testing experience has shown that if the first 5 specimens do not ignite, the next five specimens do not ignite either. Therefore, it is unnecessary to test 5 additional specimens when the original 5 specimens do not ignite. The CPSC Engineering Laboratory Test Manual states on both pages 10 and 17 that if none of the first 5 specimens burns, 5 additional specimens should not be tested.

The burning characteristics of raised fiber surfaces are complicated and determined by a combination of factors – time of flame spread and base fabric ignition (base burn) caused by a

surface flash. However, CFR 1610 does not clearly specify when it is necessary to test 5 additional specimens for raised fiber surface fabrics. The CPSC Engineering Laboratory Test Manual explains on both pages 10 and 16 the average burn time and number of base fabric ignitions that require testing of 5 additional specimens. This description could be used in the standard to avoid common misinterpretations.

3. Describe how to determine whether or not base fabric ignition occurs during a test for raised fiber surface fabrics

It is important to clarify when base fabric ignition or base burn (caused by the surface flash) occurs during a test because it partially determines the need for testing additional specimens and fabric classification. However, there is no clear definition of base burn for raised surface fabrics in the standard. The Appendix of CS191-53[3], which was not incorporated in the FFA, clearly defines base burn and surface flash. CS191-53 page 14 (the appendix) states that

> When a fabric having a napped, pile, tufted, or other raised-fiber surface burns, two things may occur: (1) A flame may move across the raised fibers, generally rapidly, and (2) the base fabric itself may be ignited, if the flaming of the raised fibers is of sufficient intensity to cause that effect. However, in some cases, the ignition flame itself may set fire to the base material, causing it to burn rather slowly after the surface flashing of the material has terminated. In such a case there exists a combination of two types of burning which are generally considered to constitute no unusual hazard. There is a nonhazardous surface flash which has not enough intensity to ignite the base fabric itself, and there is a rather slow burning, or normal combustion of the fabric resulting from ignition by the flame of the tester. The real danger from a fabric with a raised-fiber surface results from a rapidly spreading flame which has sufficient intensity to cause the fabric to ignite the base structure over a wide area. This latter effect can easily be observed in the tester, and should not be confused with occasional freak ignitions of the base fabric as described above, where the surface flash may have little volume or intensity.

Section 1610.61 (Subpart C—Interpretations and policies) explains that the "base fabric ignition or fusion ...shall have to be associated with the propagating surface flame and not the igniting flame" of the tester. CPSC Engineering Laboratory Test Manual page 16 also states that "base burns are those base burns that occur on the specimen in the places other than the point of impingement, from now on referred to as Base Burns." These clarifications could be added to the standard to improve reporting accuracy.

4. Add test result codes for reporting consistency

There are no codes in the standard to report complex test results consistently. The CPSC laboratory developed some test result codes many years ago to record the test results. Industry members and test laboratories have adopted some of the CPSC codes, but also developed some of their own codes. Currently, there are no standard test result codes to report fabric

flammability. Reporting test results and describing burning characteristics could be difficult without the standard codes to follow. There are some codes for reporting test results in the CPSC Engineering Laboratory Test Manual that could be revised, expanded, and added to the standard. Standard codes would facilitate reporting accuracy, understanding of flammability performance, and resolution of test result differences among laboratories.

5. Clarify calculations required to determine burn rates and classification

CFR 1610 section 1610.32(b) page 573 generally describes the procedures of calculating average time of flame spread. However, the method to determine the flame spread time for raised fiber surface fabrics is not clearly stated. Many questions have been raised regarding calculations for raised fiber surface fabrics, such as whether the specimens with the surface flashes only are averaged with the specimens having base burns. Therefore, more specific statements of calculating average flame spread time are needed to accurately determine fabric classification.

6. Move interpretations and policies in Subpart C into appropriate sections of the standard and consider other organizational improvements to facilitate clearer understanding

CFR 1610 page 580 Subpart C section 1610.61(c)(1) *Stop cord* should be moved to section 1610.4(b)(7) *Stop cord* on page 568, 1610.61(c)(2) *Brushing* to 1610.4(c) *Brushing device* on page 569, and 1610.61(c)(3) *Criterion for failure* to 1610.3(a)(3)(ii) on page 566. This will consolidate requirements and facilitate better understanding.

Other organizational improvements, such as moving foot notes d and e into the standard, are also needed to correctly follow and understand the standard. CFR 1610 page 565 section 1610.3(a)(1)(i) states that when the time of flame spread is 4 seconds or more for plain surface fabrics, the fabrics shall be classified as Class 1, normal flammability. Then foot notes d and e state that the 3.5 second burning time for plain surface fabrics is applicable after the amendment. It is obvious that it will facilitate following and understanding the standard if foot notes d and e are moved to the text.

7. Specify silica gel desiccant instead of anhydrous calcium chloride

CFR 1610 page 571 section 1610.4 (f) specifies anhydrous calcium chloride as the desiccant to allow specimens to cool before testing without reabsorbing moisture. However, the CPSC Engineering Laboratory Test Manual page 6 specifies silica gel. The specification for the desiccant needs to be consistent to avoid confusion. It is known that silica gel is more effective and reliable. It is also more economical to use silica gel because it is a hydrate and can be regenerated[4].

8. Provide for the use of tape in specimen mounting

When clamps will not hold thin specimens in the specimen holder securely, it is necessary to use tape in specimen mounting. CFR 1610 does not specify the use of tape in specimen mounting. However, the CPSC Engineering Laboratory Test Manual page 12 specifies using tape to secure

the specimens in the specimen holder, which could be added to the standard to help ensure reliable test results.

9. Explain the purpose of brushing specimens with the brushing device and specify when brush should be replaced

CFR 1610 does not specify the purpose of brushing specimens and when it is necessary to replace the brush. The purpose of brushing specimens is to assure reproducible test results with varying pile heights and to raise the surface for a worst case test. The brush consists of two rows of stiff nylon bristles. New brushes are rougher than brushes that have been used for a long time. Questions have been raised concerning the effect of brushes on fabric flammability. It is uncertain at this time whether test results of fabric flammability will be different when different brushes (new or used) are used. No study has been done regarding the effect of different brushes on fabric flammability. The staff seeks comments on the necessity of specifying brush replacement times.

10. Specify details of specimen conditioning--oven type, desiccator size, holding rack, time for cooling, etc.

CFR 1610 page 571 section 1610.4(f) states that before specimens are tested, they are dried in a horizontal position in an oven for 30 minutes at 221°F (105°C), removed from the oven, and placed over anhydrous calcium chloride in a desiccator until cool, but not for less than 15 minutes. The oven temperature and the time that the specimens are kept in the oven are very specific and no tolerances are listed in the standard. It is a common practice to have reasonable tolerance ranges. The CPSC Engineering Laboratory Test Manual page 13 provides tolerances for both temperature (105 ± 2°C) and time (30 ± 2 minutes).

Oven type, desiccator size, holding rack, and time for cooling are not clearly specified in the standard. Questions have been raised concerning the effect of these factors on fabric flammability. However, no research has been done to show that these could affect test results. The CPSC Engineering Laboratory Test Manual specifies oven type (page 6), desiccator size (page 6), holding rack (page 5), and time for cooling (pages 13-14). The staff seeks comments on the necessity of specifying oven type, desiccator size, holding rack, time for cooling, etc. in the standard.

11. Use of fabric/garment care label to determine requirements for drycleaning and laundering

When the standard was originally developed, there was no fabric/garment care label requirement. Currently, care labels are required by Federal Trade Commission to be attached to the garments permanently. It may be appropriate for dry cleaning and laundering during flammability testing to reflect the care procedures stated on the care label. For instance, if dry cleaning is not required according to the care label, dry cleaning may not be needed for flammability testing. If a garment requires dry cleaning only, washing may not be necessary. The staff seeks public comments on this issue.

12. Delete Section 1610.5 Notes

CFR 1610 page 572 section 1610.5 states that

> The methods of test and classification outlined herein agree with all essential requirements of the Standard Test Method for Flammability of Clothing Textiles, of the American Association of Textile Chemists and Colorists.

This paragraph should be deleted from the standard because AATCC's clothing flammability test method (adopted in 1962) was discontinued in 1982.

This memo identifies certain portions in the current standard that may require revision. There might be other portions in the standard that also need to be changed.

References

1. 16 CFR part 1610, Standard for the Flammability of Clothing Textiles (Revised as of January 1, 1999), Consumer Product Safety Commission.

2. Test Manual, Compliance Testing of General Wearing Apparel, May 1981, Engineering Laboratory, Consumer Product Safety Commission.

3. Commercial Standard 191-53, Flammability of Clothing Textiles (Effective Date, January 30, 1953), Department of Commerce.

4. Memorandum to Robert G. Poth, CARM, from Jean C. Williams, ESEL, Justification for Laboratory Procedural Changes, June 1981, Consumer Product Safety Commission.

Tab D

DRAFT 5/14/2002 [Billing Code 6355-01-P]

CONSUMER PRODUCT SAFETY COMMISSION

16 CFR Part 1610

Standard For the Flammability of Clothing Textiles;

Advance Notice of Proposed Rulemaking

AGENCY: Consumer Product Safety Commission.

ACTION: Advance Notice of Proposed Rulemaking.

SUMMARY: The Commission is considering amending the flammability standard for clothing textiles. The standard, originally issued in 1953, has become outdated in several respects. The Commission is considering changes that would enable the standard to better reflect current consumer practices and technologies and would clarify several aspects of the standard. The Commission invites comments concerning the risk of injury identified in this notice, the regulatory alternatives being considered, and other possible alternatives. The Commission also invites submission of any existing standard or statement of intention to modify or develop a voluntary standard to address the flammability risk of clothing textiles.

DATE: Comments and submissions must be received by [**insert date 60 days after publication**].

ADDRESS: Comments should be mailed, preferably in five copies, to the Office of the Secretary, Consumer Product Safety Commission, Washington, D.C. 20207-0001, or delivered to the Office of the Secretary, Consumer Product Safety Commission, Room 502, 4330 East-West Highway, Bethesda, Maryland 20814; telephone

(301) 504-0800. Comments also may be filed by telefacsimile to (301)504-0127 or by email to cpsc-os@cpsc.gov. Comments should be captioned "Clothing ANPR."

FOR FURTHER INFORMATION CONTACT: Margaret Neily, Directorate for Engineering Sciences, Consumer Product Safety Commission, Washington, D.C. 20207; telephone (301) 504-0508, extension 1293.

SUPPLEMENTARY INFORMATION:

A. Background

1. History of the Standard

The Commission is considering amending the Standard for the Flammability for Clothing Textiles, 16 CFR Part 1610, which covers clothing and textile fabrics intended for use in clothing. It excludes hats, gloves, footwear, and interlining fabrics. The standard provides a test to determine whether such clothing and fabrics exhibit "rapid and intense burning," and are therefore highly flammable.

In 1953, Congress enacted the Flammable Fabrics Act of 1953 ("FFA"), (Pub. L. 83-88, 67 Stat. 111). As enacted in 1953 and amended in 1954, the FFA prohibited the importation, manufacture for sale, or the sale in commerce of any article of wearing apparel, which is "so highly flammable as to be dangerous when worn by individuals." The FFA of 1953 specified that a test, first published by the Department of Commerce as a voluntary commercial standard, then called "Flammability of Clothing Textiles, Commercial Standard ("CS") 191-53," shall be used to determine if fabric or clothing is "so highly flammable as to be dangerous when worn by individuals."

In 1967, Congress amended the FFA, expanding its coverage and authorizing the Secretary of Commerce to issue flammability standards through rulemaking. A savings clause kept the flammability standard for clothing textiles that the 1953 Act had mandated into effect until superseded or modified by the Secretary of Commerce through the procedures specified in the 1967 amendment. See section 11 of Pub. L. 90-189, 81 Stat. 568, December 14, 1967.

In 1972, Congress established the Consumer Product Safety Commission when it enacted the Consumer Product Safety Act ("CPSA"), 15 U.S.C. 2051 *et seq*. The CPSA transferred to the Commission the authority the Secretary of Commerce had to issue and amend flammability standards under the FFA. 15 U.S.C 2079(b). In 1975, the Commission codified the FFA of 1953 at 16 CFR 1609 and the Standard for the Flammability of Clothing Textiles at 16 CFR 1610. It is this standard that the Commission is considering amending.

2. The Current Standard

The clothing textile standard describes a test apparatus and the procedures for testing clothing and textiles intended for clothing. It establishes three classes of flammability: class 1 or normal flammability; class 2 or intermediate flammability; and class 3 or rapid and intense burning. Clothing and textiles that are categorized as class 3 under the prescribed test method are considered dangerously flammable. 16 CFR 1610.3

To determine the appropriate classification, the standard prescribes the method of testing. Five specimens are subjected

to a flammability tester. This is a draft-proof ventilated chamber containing an ignition medium, a sample rack and an automatic timing device. Id. 1610.4(b). The ignition medium is a spring-motor driven gas jet around a 26-gage hypodermic needle. Id. 1610.4(b)(6). A swatch of each sample must be subjected to the dry cleaning and hand washing procedure prescribed by the standard. Id. 1610.4(d)&(e). To determine results, the average time of flame spread is taken for five specimens. However, if the time of flame spread is less than 4 seconds (3 1/2 seconds for plain-surfaced fabrics) or the specimens do not burn, five additional specimens must be tested and the average time of flame spread for these ten specimens taken. Id. 1610.4(g)(7). Classification is based on the reported results before and after drycleaning and washing, whichever is lower. Id. 16110.4(g)(8). [SHOULD I SAY SOMETHING ABOUT BASE FABRIC IGNITION?]

B. Statutory Provisions

The FFA sets forth the process by which the Commission can issue or amend a flammability standard. The Commission first must issue an advance notice of proposed rulemaking ("ANPR") which: (1) identifies the fabric or product and the nature of the risk associated with the fabric or product; (2) summarizes the regulatory alternatives under consideration; (3) provides information about existing relevant standards and reasons why the Commission does not preliminarily believe that these standards are adequate; (4) invites interested persons to submit comments concerning the identified risk of injury, regulatory alternatives being considered, and other possible alternatives; (5) invites

submission of an existing standard or portion of a standard as a proposed regulation; and (6) invites submission of a statement of intention to modify or develop a voluntary standard to address the risk of injury. 15 U.S.C. 1193(g).

If, after reviewing comments and submissions responding to the ANPR, the Commission determines to continue the rulemaking proceeding, it will issue a notice of proposed rulemaking. This notice must contain the text of the proposed rule along with alternatives the Commission has considered and a preliminary regulatory analysis. 15 U.S.C. 1193(i). Before issuing a final rule, the Commission must prepare a final regulatory analysis, and it must make certain findings concerning any relevant voluntary standard, the relationship of costs and benefits of the rule, and the burden imposed by the regulation. Id. 1193(j). The Commission also must provide an opportunity for interested persons to make an oral presentation before the Commission issues a final rule. Id. 1193(d).

C. Possible Amendment

This notice initiates the rulemaking process to amend the flammability standard for clothing and textiles intended for clothing.

1. The Products

The products of concern are clothing and fabrics intended to be used for clothing. The flammability standard applies to all items of clothing, and fabrics used for such clothing, whether for adults or children, for daywear or nightwear. The changes the Commission is considering would not affect the scope

of the standard, but would modernize the test method.

2. The Risk of Injury

According to the standard, its purpose is to "reduce danger of injury and loss of life by providing, on a national basis, standard methods of testing and rating the flammability of textiles and textile products for clothing use, thereby discouraging the use of any dangerously flammable clothing textiles." 16 CFR 1610.1. Any amendments the Commission is considering would continue to address this risk of injury. Changes to the test method to better reflect current practices and technologies and clarify some aspects of the standard may improve the standard's ability to address the risk of injury. Based n the most recent five years of available data, 153 deaths and an estimated 4,000 hospital emergency department-treated injuries result annually from the ignition of clothing.

3. Regulatory Alternatives

The Commission is considering changes to the clothing textile flammability standard that would modernize and clarify it. Only minimal changes, such as removing obsolete footnotes, have been made since its development in 1953. However, clothing and technology have undergone many changes in that time. Below, is a discussion of the changes the Commission is considering at this point.

Changes to the flammability tester. The flammability tester prescribed in the current standard is a mechanical apparatus that is no longer available. Apparel manufacturers and other testing laboratories now use more modern flammability

testers that incorporate electronic timers and several other electro-mechanical devices that control and apply flame impingement. The Commission is considering requiring a more modern flammability tester.

Changes to the dry cleaning procedure. The method of dry cleaning the current standard prescribes requires perchloroethylene in an open vessel. However, perchloroethylene has been shown to cause cancer in animal tests, and use in this manner violates regulations issued by the Environmental Protection Agency. The Commission staff has not used this procedure since 1986. (The standard allows alternate procedures if they are as stringent as the specified procedure.) An alternative procedure using commercial dry cleaning procedures and washing/tumble drying as provided in ASTM D 1230 appears to be just as stringent, if not more so, as the outdated dry cleaning procedures required by 16 CFR part 1610.

Changes to the hand washing procedure. The current standard requires that after fabric specimens are dry cleaned they must be hand washed with neutral chip soap and line dried before testing them for flammability. 16 CFR 1610.4(e). However, this practice is outdated. Neutral chip soap is no longer available to consumers, who now use non-phosphate detergent and usually use home washers and dryers. Moreover, limited testing by CPSC indicates that for some raised surfaces the machine wash/tumble dry method is more stringent than the procedure now required by the standard. The Commission is considering laundering requirements similar to those prescribed

in American Association of Textile Chemists and Colorists ("AATCC") 124-1996. This would be consistent with changes the Commission recently made to the laundering requirements for flammability standards for children's sleepwear, carpets and rugs, and mattress pads. 65 FR 12924, 12929, and 12935 (March 10, 2000).

The Commission is also considering clarifying several portions of the standard. When the staff conducts flammability testing it follows CPSC's Laboratory Test Manual. The Test Manual provides specific directions that aid in appropriate testing. The Commission is considering using some portions of the Test Manual to clarify aspects of the standard, as discussed below.

Clarify selection of surface/direction for testing. The standard requires that for textiles without a raised-fiber surface, "the long dimension shall be that in which they burn most rapidly, and the more rapidly burning surface shall be tested." 16 CFR 1610.4(a)(2). However, the standard does not clearly describe how to select the sample surface and direction for testing. Similarly, for textiles with a raised-fiber surface, specimens must be taken from the part that has the fastest rate of burning. 16 CFR 1610(a)(3). However, the standard does not describe how to determine which area is the most flammable. Language from CPSC's Test Manual could be used to clarify both of these procedures. The Commission is also considering whether to add directions on how to test specialty fabrics.

Clarify when to test 5 additional specimens. The standard states that for plain-surface fabrics if the time of flame spread is less than 3.5 seconds or if the first five specimens do not burn, five additional specimens should be tested. 16 CFR 1610.4(g)(7). However, CPSC testing experience has shown that if the first five specimens do not ignite, the next five specimens will not ignite either. The CPSC Engineering Laboratory Test Manual states that if none of the first five specimens burns, five additional specimens should not be tested. As for raised-fiber surfaces, whose burning characteristics are complicated, the standard does not clearly specify when it is necessary to test five additional specimens. CPSC's Test Manual could be used to clarify this.

Clarify when base fabric ignition occurs. Whether the base fabric ignites during testing is important because it is a factor in determining whether additional testing is necessary and what the fabric classification should be. However, the standard provides no clear definition of base burn for raised-surface fabrics. The Appendix of CS 191-53, which was not incorporated in the FFA, clearly defines base burn and surface flash. CPSC's Test Manual also contains a clarification. These could be added to the standard.

Add test result codes. The standard provides no codes to report complex test results consistently. CPSC developed some codes many years ago to record test results. Industry members and test laboratories have adopted some of the CPSC codes, but also developed some of their own codes. Uniform result codes

would facilitate reporting accuracy, understanding of flammability performance, and resolution of test result differences among laboratories.

Clarify calculations for determining burn rates and classification. The standard generally describes the procedures of calculating average time of flame spread. However, it does not clearly state the method to determine the flame spread time for raised-fiber surface fabrics. More specific direction on calculating average flame spread time would enable more accurate fabric classification.

Specify different desiccant. The standard specifies anhydrous calcium chloride as the desiccant to allow specimens to cool before testing without reabsorbing moisture. CFR 1610 1610.4(f). However, CPSC's Test Manual specifies silica gel. Silica gel is more effective, reliable and economical.

Other possible changes. The Commission is considering several other possible changes. For example, the Commission is considering some changes to the organization of the standard to consolidate it and make it easier to understand. The Commission is also considering: specifying that tape can be used to secure specimens in the specimen holder; specifying the purpose of brushing specimens and when replacing the brush is necessary; specifying the details of specimen conditioning; and requiring only the type of laundering/drycleaning specified on a garment's care label. The Commission is also considering clarifying and amending regulations concerning fabrics exempted from testing for guaranties. See 16 CFR 1610.37(d).

4. Existing Relevant Standards

The Commission staff conducted a review to find other relevant textile standards. The staff found three relevant standards with modern dry cleaning methods and/or laundering methods.

American Society for Testing and Materials (ASTM)D 1230-94, Standard Test Method for Flammability of Apparel Textiles. This voluntary standard provides methods for testing and evaluating the flammability of textile fabrics used as apparel in both original state condition and after refurbishment. The standard specifies two dry cleaning options. However, only one -- any commercial dry cleaning operation in a closed environment for one cycle -- is still available. After the fabric is dry cleaned, it is laundered using home-type washing and drying machines. The standard refers to the American Association of Textile Chemists and Colorists (AATCC) Test Method 135 entitled Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics. This voluntary standard specifies the type of detergent, washing and drying conditions and washer and dryer specifications. An analysis of the laboratory test data from an ASTM interlaboratory round robin conducted in 1991 indicates that for specimens subjected to ASTM D 1230 (both dry cleaning and machine laundering followed by tumble drying procedures specified in AATCC Test Method 135), this flammability test was as stringent or more stringent than the refurbishing procedure in 16 CFR Part 1610.

British Standards Institution ("BSI") BS EN ISO 3175: 1996

Textile -- Evaluation of Stability to Machine Drycleaning. The purpose of this standard is to determine whether normal to very sensitive fabrics can be dry cleaned by examining dimensional changes after three to five cleaning treatments. It uses a commercial dry cleaning machine containing perchloroethylene and a detergent followed by some form of steam treatment and/or hot pressing (a lesser drying temperature or line drying is used for fabrics containing heat sensitive fibers). This standard uses a modern procedure, a commercial dry cleaning machine, but such a machine would not necessarily be available in the U.S. and would have to have appropriate environmental controls installed. The standard does not have a laundering procedure.

Canadian General Standards Board ("CGSB") CAN/CGSB-4.2 No. 30.3-94, Procedure for the Removal of Non-permanent Flame-retardant Treatments from Textile Products. The purpose of this dry cleaning and laundering standard is to test fabrics for the presence of nonpermanent flame-retardant treatments applied to textile products. The procedures specify that the fabric should be initially dry cleaned in either a coin-operated perchloroethylene dry cleaning machine or in any commercial dry cleaning operation. This is followed by laundering in a domestic-type washing machine using neutral chip soap and dried according to the care instructions provided by the fabric manufacturer. One dry cleaning and one laundering cycle are recommended. The washing machine specified in this standard is not currently available in the U.S.

5. Invitations to Comment

In accordance with section 4(g) of the FFA, the Commission invites comments on this notice, specifically:

1. comments concerning the risk of injury identified in this notice, the regulatory alternatives discussed above, and other alternatives to address the risk of injury;

2. an existing standard or portion of a standard as a proposed rule;

3. a statement of intention to modify or develop a voluntary standard to address the risk of injury identified in the notice along with a description of a plan to modify or develop the standard.

In addition, the Commission is interested in obtaining further information and comments about the possible changes to the clothing flammability standard discussed above, such as:

1. modernizing the flammability tester;

2. updating the prescribed dry cleaning method;

3. updating the laundering method described in the standard;

4. revising or clarifying confusing test procedures;

5. developing standardized language for interpreting and reporting test results;

6. reorganizing some text of the rule for clarity; and

7. clarifying or amending the exemptions from the requirements for testing to support guaranties at 1610.37(d).

Dated: _____

_____
Todd A. Stevenson, Secretary
Consumer Product Safety Commission

List of Relevant Documents

1. Briefing memorandum from Jacqueline Elder, Acting Assistant Executive Director, EXHR and Margaret Neily, Project Manager, Directorate for Engineering Sciences, to the Commission, "Amending the Standard for the Flammability of Clothing Textiles, 16 CFR 1610," _____, 2002.

2. Memorandum from Weiying Tao, Division of Electrical Engineering, to Margaret Neily, Project Manager, "Amending the Flammability Tester Specifications, the Dry Cleaning and Washing Procedures of the CPSC Flammability Regulations in 16 CFR 1610," February 28, 2002.

3. Memorandum from Weiying Tao , Division of Electrical Engineering, to Margaret Neily, Project Manager, "Alternate Dry Cleaning and Washing Requirements of Apparel Specified in Standards Other than 16 CFR Part 1610 Standard for the Flammability of Clothing Textiles," March 1, 2002.

4. Memorandum from Weiying Tao, (previously) on detail to ESME, to Margaret Neily, Project Manager, Proposed Revisions for the Standard for the Flammability of Clothing Textiles,"March 25, 2002.